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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,450	10/23/2003	Ajay Kapur	RD-28357-1	8030

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EXAMINER
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WANG, CLAIRE X

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/692,450	KAPUR ET AL.	
	Examiner	Art Unit	
	Claire Wang	2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 20-26 is/are rejected.
- 7) ☒ Claim(s) 17-19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/23/2003</u>  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claim limitation which states "2-dimensional (2D) data from which the first image is generated with 3-dimensional (3D) data obtained by scanning the object with the second imaging system" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Double Patenting***

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 12, 14 and 15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 9 of copending Application No. 10/062,334. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims of the instant application are broader than those of Application No. 10/062,334.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Application No. 10/062,334	Instant Application
Claim 9	Claim 12
<p>A method for generating an image of an object of interest, said method comprising:</p> <p>a) compressing an object of interest using a compression paddle;</p> <p>b) acquiring a two-dimensional dataset of the object, at a first position, using an X-ray source and a detector;</p> <p>c) positioning an ultrasound probe mover assembly adjacent the compression paddle such that the second three-dimensional dataset obtained with the ultrasound probe mover assembly is co-registered with the first three-dimensional dataset obtained through the compression paddle by mechanical design;</p> <p>d) operationally coupling an ultrasound probe with the probe mover assembly such that the ultrasound probe emits an ultrasound output signal through the compression paddle and the object of interest;</p> <p>e) acquiring a three-dimensional dataset of the object, at the first position, using an ultrasound probe; and</p> <p>f) combining the two-dimensional dataset and the second three-dimensional dataset to generate a three-dimensional image of the object.</p>	<p>A method for viewing an abnormality in different kinds of images, said method comprising:</p> <p>a) registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using an imaging system that is different than an imaging system used to obtain the 2D data.</p>
	<p><b>Claim 14</b></p> <p>A method in accordance with claim 12 wherein registering 3D data relative to 2D data comprises:</p> <p>a) registering 3D data acquired using an ultrasound imaging system relative to 2D data acquired using an X-ray imaging system.</p>
	<p><b>Claim 15</b></p> <p>A method in accordance with claim 14 further comprising:</p> <p>a) establishing a relationship between the 3D data acquired using the ultrasound imaging system and the 2D data acquired using the X-ray imaging system.</p>

Independent claim 12 of the instant application teaches, "A method for viewing an abnormality in different kinds of images, said method comprising: registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using an imaging system that is different than an imaging system used to obtain the 2D data." Claim 12 of the instant application does not recite the details of how the 2D and 3D data is generated or combining the two sets of data to form a 3D image as claimed in Application Number 10/062,334. However, it would have been obvious to one ordinarily skilled in the art to remove the further limitations where that functionality is not required, since omitting the limitations does not prevent the method from functioning properly and the claim is in "comprising" format, indicating other elements could be added.

Claim 14 of the instant application teaches the two systems used to acquire data are x-ray and ultrasound; where the x-ray system collects the 2D data and the ultrasound system collects the 3D data. Claim 14 of the instant application does not recite combining the two sets of data to form a 3D image as claimed in Application Number 10/062,334. However, it would have been obvious to one ordinarily skilled in the art to remove the further limitations where that functionality is not required, since omitting the limitations does not prevent the method from functioning properly and the claim is in "comprising" format, indicating other elements could be added.

Claim 15 of the instant application teaches using the location of the first image data set (2D data) to collect the second data set (3D data) with an ultrasound imaging system.

***Claim Objections***

4. Claims 3, 4, 10, 11, 21, 23 and 25 are objected to because of the following informalities:

In line 3 of claims 3, 10 and 23, the term "computer-aided design" should be changed to "computer-aided diagnosis" as defined by Paragraph [0053], line 4 of applicant's specification. For the purposes of applying prior art said language is consider to read "computer-aided diagnosis."

In claims 4, 11, 21 and 25, the word "co-ordinates" should be changed to "coordinates." For the purposes of applying prior art said language is consider to read "coordinates."

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 4-6, 8, 11-15, 21, 24 and 25 rejected under 35 U.S.C. 102(e) as being anticipated by Kapur et al. (US 2003/0149364 A1) (from this point forward will be referred to as Kapur).

As to claim 1, Kapur teaches a method for viewing an abnormality in different kinds of images, said method comprising: scanning an object using a first imaging system to obtain at least a first image of the object (Figure 5 teaches gathering a first dataset of the object at a first position); determining coordinates of a region of interest (ROI) visible on the first image (the first dataset is used to gather x-ray information of the breast, which is the object of interest in Kapur's system; the coordinates are found for the first dataset; [0034] lines 1-2), wherein the ROI includes the abnormality (Kapur teaches patients undergoing treatments for breast cancer may be monitored using his system, therefore the abnormality is read as cancer; [0047] lines 9-13); and using the coordinates of the ROI to scan the object with a second imaging system (the coordinate system of the first dataset is transformed into that of the second data set; Paragraph [0043] lines 1-5).

As to claim 8, it is the same as claim 1. The only difference is that Claim 8 is a system claim, whereas claim 1 is a method claim. Also, the system of claim 8 is an X-



Art Unit: 2624

ray imaging system and an ultrasound imaging system (Fig. 5). Therefore, claim 8 is analyzed in the same way as claim 1.

As to claim 12, Kapur teaches method for viewing an abnormality in different kinds of images, said method comprising: registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using an imaging system that is different than an imaging system used to obtain the 2D data (Kapur teaches a system where the first imaging system is an X-ray and the second imaging system is an ultrasound; digital X-rays are available in both 2D and 3D, therefore it is used to gather the first data set; ultrasound gathers 3D information, therefore it is used to collect the second data set; [0047] lines 1-3).

As to claim 21, it is the same as claim 1. The only difference between the two claims is claim 21 further teaches the method of collecting the imaging information of claim 1 is done using an X-ray and an ultrasound (Fig. 5). Also, claim 21 teaches of instructing an ultrasound probe mover to move the ultrasound probe, in order to obtain at least one ultrasound image (Kapur teaches the ultrasound probe is elector-mechanically scanning over the object of interest, it is controlled by a computer; [0041] lines 1-6).

As to claim 24, it is the same as claim 21. The only difference is that Claim 24 is a system claim, whereas claim 21 is a method claim. Therefore, claim 24 is analyzed in the same way as claim 21.

As to claim 4, it is the same as claim 21. The only difference is claim 21 teaches additional information from which claim 4 depends on. However, Kapur still reads on claim 11. Therefore, claim 4 is analyzed in the same way as claim 21.

As to claim 5, Kapur teaches displaying the first and the second images concurrently to enable a user to view the abnormality (Step 86 of Fig. 5 teaches combining the first and second datasets to generate a new image of the object; [0028] teaches of a display showing the operator of the construction of said datasets).

As to claim 6, A method in accordance with claim 1 further comprising registering 2-dimensional (2D) data from which the first image is generated with 3-dimensional (3D) data obtained by scanning the object with the second imaging system.

As to claim 11, it is the same as claim 21. The only difference is that claim 21 is a method claim whereas claim 11 is a system claim. Also, claim 11 fails to teach the scanning and determining coordinates part of claim 21. However, Kapur still reads on claim 11. Therefore claim 11 is analyzed in the same way as claim 21.

As to claim 13, Kapur teaches wherein registering 3D data relative to 2D data comprises registering 3D data relative to 2D data without using fiducial marks on a patient having the abnormality (Kapur teaches that the images are registered directly on a point by point basis, therefore it is not using a fiducial markings; [0043] lines 11-14).

As to claim 14, Kapur teaches wherein registering 3D data relative to 2D data comprises registering 3D data acquired using an ultrasound imaging system relative to 2D data acquired using an X-ray imaging system (Kapur teaches a system where the first imaging system is an X-ray and the second imaging system is an ultrasound; digital

X-rays are available in both 2D and 3D, therefore it is used to gather the first data set; ultrasound gathers 3D information, therefore it is used to collect the second data set; [0047] lines 1-3).

As to claim 15, Kapur teaches establishing a relationship between the 3D data acquired using the ultrasound imaging system and the 2D data acquired using the X-ray imaging system (Fig. 5 teaches combining the 2 datasets to form a 3D image).

As to claim 25, it is the same as claim 21. The only difference between the two claims is claim 25 fails to teach the scanning and determining coordinates part of claim 21. Also, claim 25 is a system whereas claim 21 is a method. However, Kapur still reads on claim 25. Therefore, it will be analyzed in the same way as claim 21.

### ***Claim Rejections - 35 USC § 103***

6. Claims 2-3, 9-10 and 22-23 are rejected under 35 U.S.C. 103(a) as being obvious over Kapur et al. in view of Burke et al. (US 6,421,454 B1) (from this point forward will be referred to as Burke).

As to claim 2, Kapur does not teach A method in accordance with claim 1 wherein determining coordinates of the ROI visible on the first image comprises manually marking the ROI on a display device that displays the first image. Burke teaches a mammogram of the ROI can be defined by operator input. Thus, the ROI selection of Burke reads on the claimed manually marking the ROI. Therefore, it would

Art Unit: 2624

have been obvious to one ordinarily skilled in the art at the time of the invention to combine Kapur's X-ray and ultrasound system with the ROI selection method of Burke in order to identify corresponding regions of the subject breast (Burke Col. 15, lines 33-34).

As to claim 3, it is the same as claim 2. The only difference between the two claims is that claim 3 teaches the use of a computer-aided diagnosis (CAD) algorithm (Burke Col. 15, lines 30-32). Therefore, claim 3 is analyzed in the same way as claim 2.

As to claim 9, it is the same as claim 2. The only difference between the two claims is that claim 2 is a method claim and claim 9 is a system claim. Therefore, claim 9 is analyzed in the same way as claim 2.

As to claim 10, it is the same as claim 3. The only difference between the two claims is that claim 3 is a method claim and claim 10 is a system claim. Therefore, claim 10 is analyzed in the same way as claim 3.

As to claim 22, it is the same as claim 2. Therefore, claim 22 is analyzed in the same way as claim 2.

As to claim 23, it is the same as claim 3. Therefore, claim 23 is analyzed in the same way as claim 3.

7. Claims 7, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kapur in view of Fu et al. (US 2005/0047544 A1) (from this point forward will be referred to as Fu).

As to claim 7, Kapur does not teach wherein registering 2D data from which the first image is generated with 3D data comprises: obtaining at least six equations having at least six unknowns, wherein each equation establishes a relationship between coordinates of 2D data acquired from the first imaging system and coordinates of 3D data acquired from the second imaging system; and solving the six equations to obtain the six unknowns. Fu teaches the differences in the position and orientation of the anatomical target images within a radiographs correspond to the difference in the 3D position with in a target 3D coordinate frame are solved by finding the parameters (s, y, z, r, p, w). Thus Fu's parameters read on the claimed 6 unknowns. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the invention to combine Kapur's X-ray and ultrasound system with Fu's correlation parameters in order to have a precise and rapid way to register 2D images with 3D scan data (Fu [0009] lines 1-3).

As to claim 16, it is the same as claim 7. The only difference between the two claims is claim 16 further teaches that 2D data is gathered using an X-ray and the 3D data is gathered using an ultrasound (Kapur Fig. 5). Therefore, claim 16 is analyzed in the same way as claim 7.

As to claim 20, Fu teaches obtaining six additional equations having six additional unknowns, wherein each of the six additional equations establishes a relationship between coordinates of 2D data acquired from the X-ray imaging system and coordinates of 3D data acquired from the ultrasound imaging system; solving the six additional equations to obtain the six additional unknowns; and averaging a first

Art Unit: 2624

unknown of the six unknowns with a corresponding first additional unknown of the six additional unknowns (Fig. 3 shows the different ways of finding an relating the 6 unknowns through multi-dimensional matching).

As to claim 26, it is the system claim of 7. Therefore, claim 26 is analyzed in the same way as claim 7.

### ***Allowable Subject Matter***

8. Claims 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 17, the innovation distinction that makes the claim allowable is the three equations defined by the claim.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Besson et al. (US 6,846,289 B2) teaches an integrated X-ray and ultrasound medical imaging system.

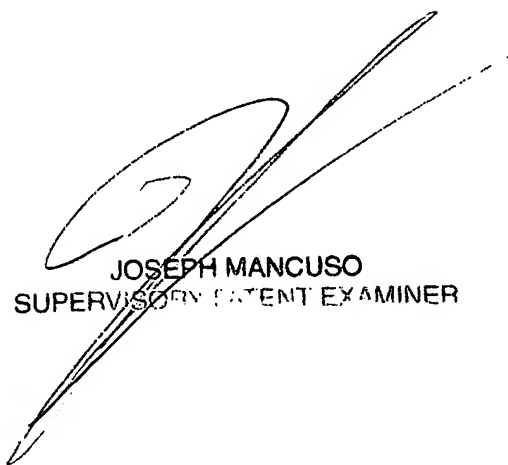
Carrott et al. (US 6,396,940 B1) teaches an optical correlator based on ROI selector for 3D ultrasound and digital mammography.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Claire Wang whose telephone number is 571-270-1051. The examiner can normally be reached on 5/4/9.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Claire Wang  
1/6/2007



JOSEPH MANCUSO  
SUPERVISORY PATENT EXAMINER